New England Common Assessment Program

Released Items
2011

Grade 11
Mathematics

Mathematics
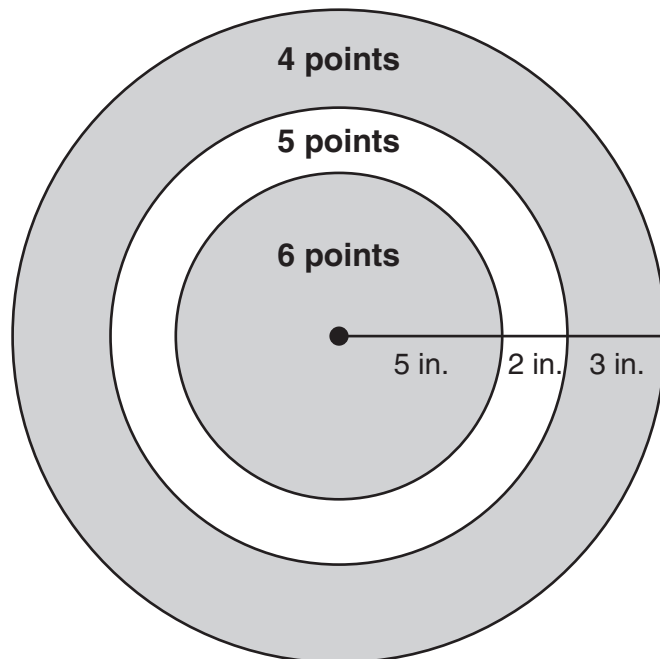
1 The ratio of the volumes of two cubes is 1:64. What is the ratio of the edge lengths of the two cubes?
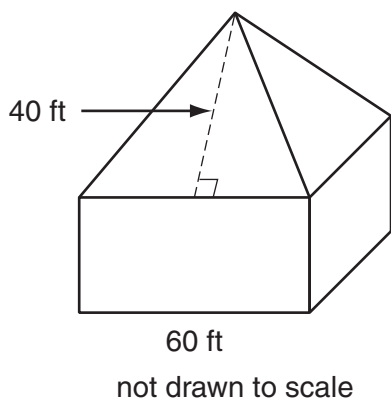
- A. 1:4
- B. 1:8
- C. 1:16
- D. 1:64

2 Look at this target.

Which expression represents the area, in square inches, of the section of the target that is labeled "4 points"?

- A. $3^2\pi$
- B. $10^2\pi$
- C. $(7^2 - 3^2)\pi$
- D. $(10^2 - 7^2)\pi$

3 A diagram of a building is shown.

40 ft

60 ft

not drawn to scale

The building has a roof in the shape of a square pyramid. The slant height of the roof is 40 ft. What is the total surface area of the roof?

A. 9600 ft²

B. 8400 ft²

C. 4800 ft²

D. 2400 ft²

4 One mile is equivalent to 320 rods. One square mile is equivalent to 640 acres. How many square rods are in 1 acre?

A.   2

B.   4

C.   160

D.   960

5 Quadrilateral *PQRS* has vertices at these coordinates.

- *P* (6, 5)
- *Q* (2, 4)
- *R* (4, 0)
- *S* (7, 1)

Which statement is true?

A. $\overline{PQ}$ is parallel to $\overline{RS}$.

B. $\overline{PQ}$ is perpendicular to $\overline{PS}$.

C. $\overline{QR}$ is parallel to $\overline{PS}$.
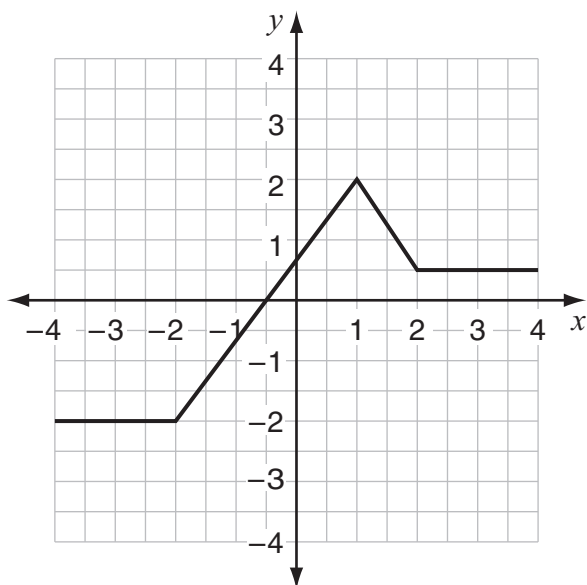
D. $\overline{QR}$ is perpendicular to $\overline{RS}$.

6 This table shows the perimeters, in inches, of rectangles with different widths.

Width (in.)	Perimeter (in.)
1	$6x + 4$
2	$6x + 6$
3	$6x + 8$
4	$6x + 10$
5	$6x + 12$

Based on the table, what is the width of a rectangle with a perimeter of $6x + 50$ inches?

A. 24 inches

B. 25 inches

C. 40 inches

D. 47 inches

2

7 Look at this graph of a function.

For which values of x does the function have a rate of change that is less than zero?

A. between –4 and –2

B. between –2 and 1

C. between 1 and 2

D. between 2 and 4

8 A theater group earned a total of $5180 selling tickets to a musical.

- Tickets for balcony seats sold for $5 each.

- Tickets for orchestra seats sold for $8 each.

- The group sold four times as many tickets for balcony seats as for orchestra seats.
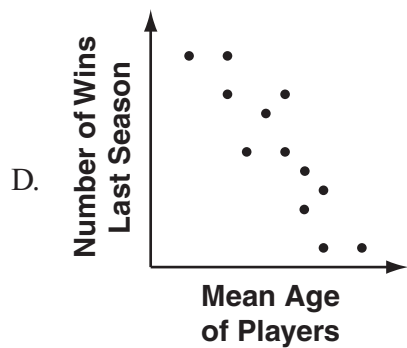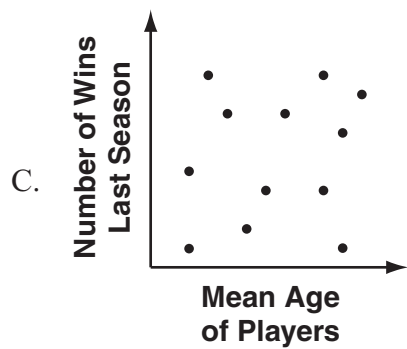
How many tickets for balcony seats were sold?

A. 140

B. 360

C. 560

D. 740

9 Trevor has $6 to spend on raisins and peanuts. Raisins cost $1 per pound, and peanuts cost $2 per pound. Which graph shows the relationship between the number of pounds of raisins and the number of pounds of peanuts that Trevor can buy?

A.

Pounds of Peanuts
Pounds of Raisins

B.

Pounds of Peanuts
Pounds of Raisins

C.

Pounds of Peanuts
Pounds of Raisins

D.

Pounds of Peanuts
Pounds of Raisins
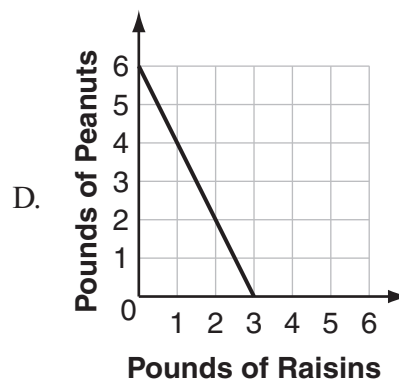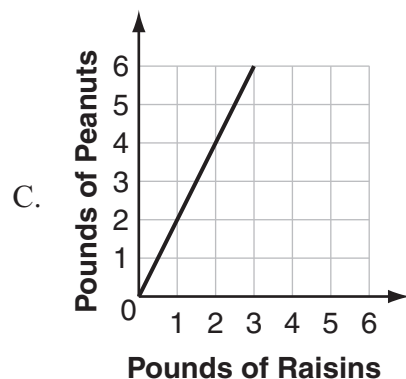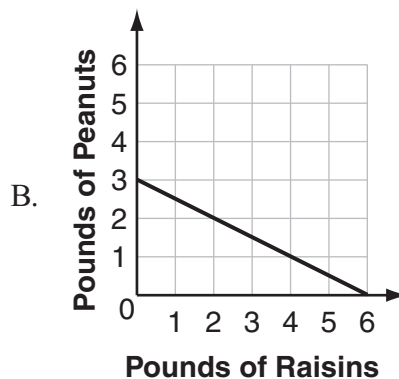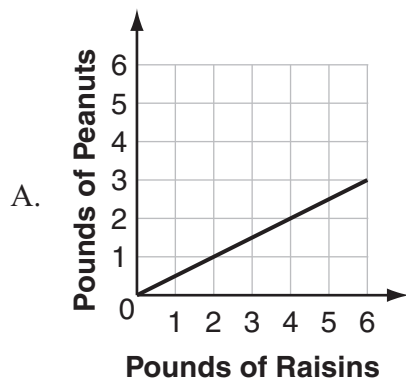
10 Which graph shows a strong negative correlation between the mean age of the players on professional basketball teams and the number of wins last season?

A.

Number of Wins Last Season

Mean Age of Players

B.

Number of Wins Last Season

Mean Age of Players

C.

Number of Wins Last Season

Mean Age of Players

D.

Number of Wins Last Season

Mean Age of Players

5
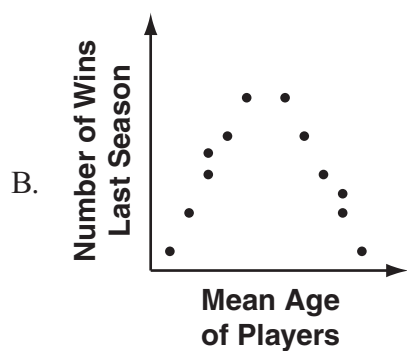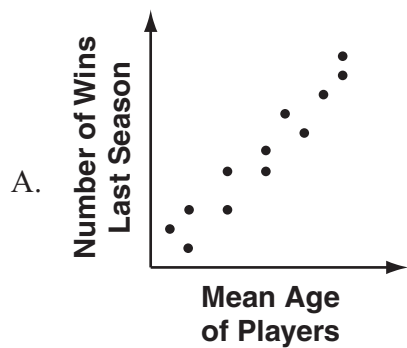
11 Joshua asked 50 college students, "What career field do you plan to enter when you graduate?" His data are shown in this table.

Career Field	Number of College Students
Education	16
Medicine	10
Law	4
Other	20

Which circle graph shows the data?

A.

B.

C.

D.
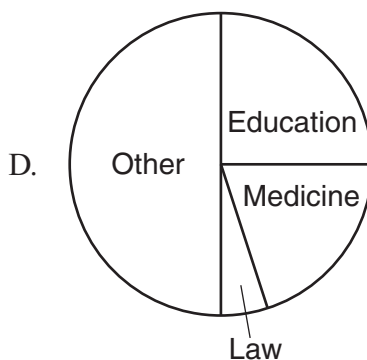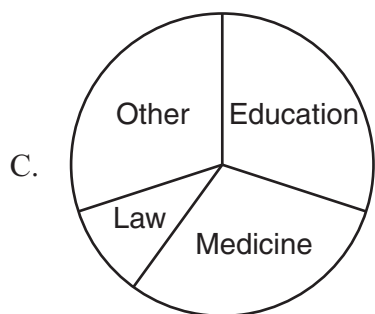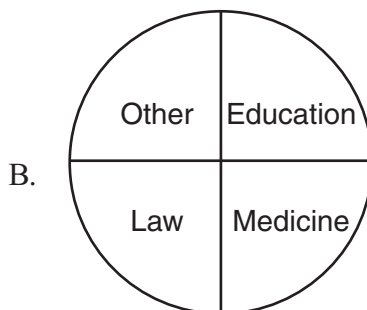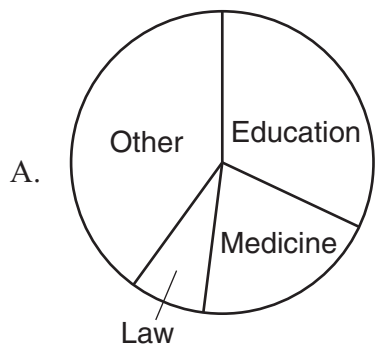
⓬ Eliza spun the arrow on a spinner several times. For each spin, she recorded the color of the section in which the arrow stopped. Eliza's results are shown in this table.

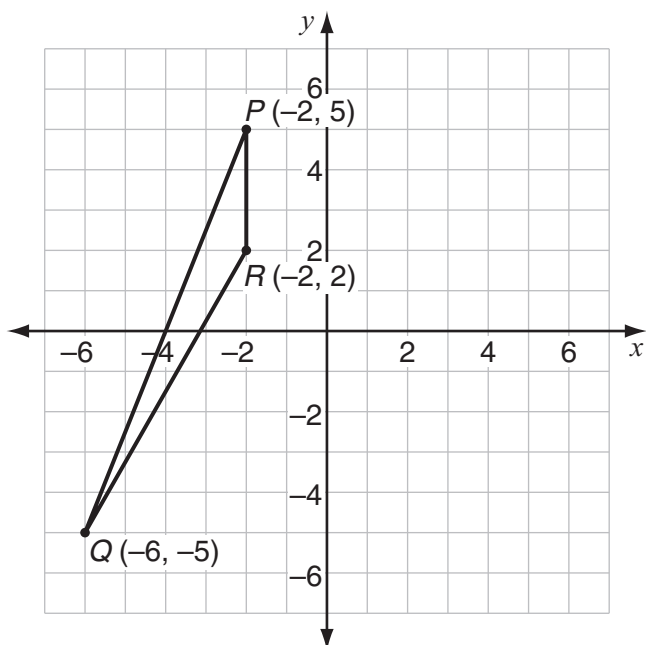| Color	Number of Times
Red	21
Blue	15
Green	24

Eliza will spin the arrow on the spinner one more time. Based on the data in the table, what is the probability the arrow will stop in the red section?

A. $\dfrac{21}{100}$
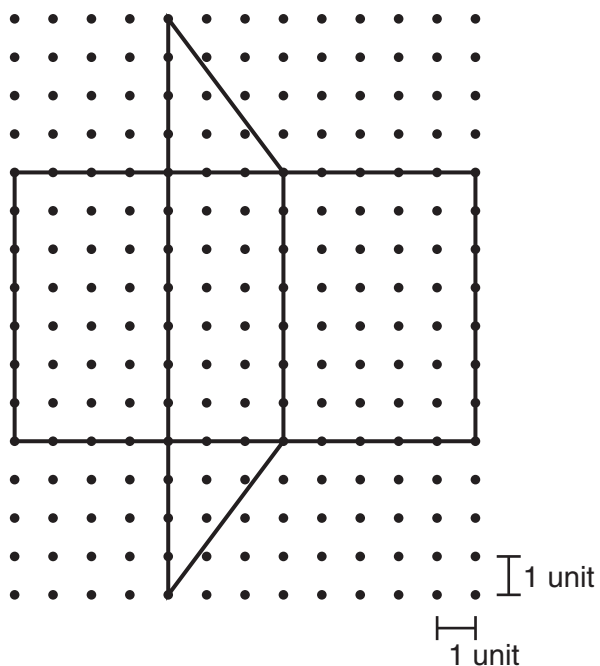
B. $\dfrac{1}{3}$

C. $\dfrac{7}{20}$

D. $\dfrac{7}{13}$

⑬ Look at triangle *PQR* on the grid below.

What are the coordinates of the image of point *Q* after triangle *PQR* is reflected over line *PR*?

14 This diagram shows the net of a triangular prism.

1 unit

1 unit

What is the volume, in cubic units, of the triangular prism that can be made from this net?

15 This table shows a relationship between x and y.

x	5	10	15	20
y	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{30}$	$\frac{1}{40}$

Write an equation that shows the same relationship between x and y as in the table.

16 Sophia uses the equation below to estimate the percent, p, of games a baseball team is expected to win based on the number of runs scored, s, and the number of runs the team allows, a.

$$p = \frac{s^2}{s^2 + a^2} \times 100$$

Sophia's favorite baseball team scored 200 runs and allowed 150 runs. What percent of games is this team expected to win?

17 The width of a rectangle is w feet. The length of the rectangle is 3 feet less than twice its width. Write an expression that represents the area, in square feet, of the rectangle in terms of w.

18 The quality control officer at a tire factory reported that 20 tires were defective out of a sample of 10,000 tires. What is the probability that a tire made at this factory is **not** defective?
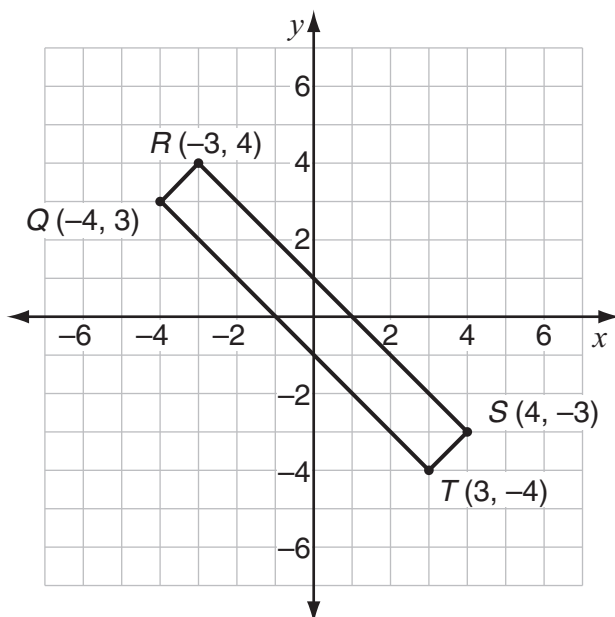
19 Look at this number line.
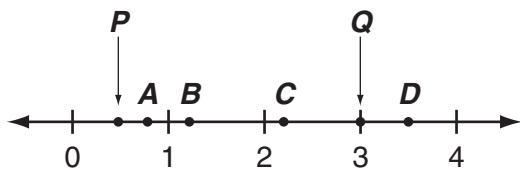
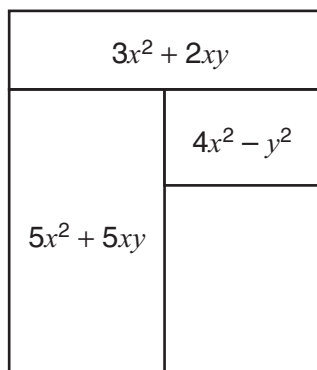Which point is closest in value to $Q\sqrt{P}$? Show your work or explain how you know.

20 Look at rectangle $QRST$.

What is the perimeter, in units, of rectangle $QRST$? Show your work or explain how you know.

21 The expression inside each of these rectangles represents the area, in square units, of the rectangle.

$3x^2 + 2xy$

$4x^2 - y^2$

$5x^2 + 5xy$

a. Write an algebraic expression in simplified form to represent the sum of the areas of all the rectangles.

b. What is the total area, in square units, of the rectangles when $x = 5$ and $y = 2$?

22 Customer service surveys were sent to 200 cell phone users. Of those users, 80 completed the survey.

a. What percent of the 200 cell phone users completed the survey?

Of the users who completed the survey, 75% rated their overall service as excellent.

b. How many users rated their overall service as excellent?

Some of the cell phone users who completed the survey were sent a gift. Of these, 40%, representing 6 users, rated their service as excellent.

c. How many cell phone users who completed the survey were sent a gift? Show your work or explain how you know.

12

㉓ The value of an antique chair increases exponentially. This graph shows the chair's value over a set of four ten-year periods.

Value of Antique Chair over Time
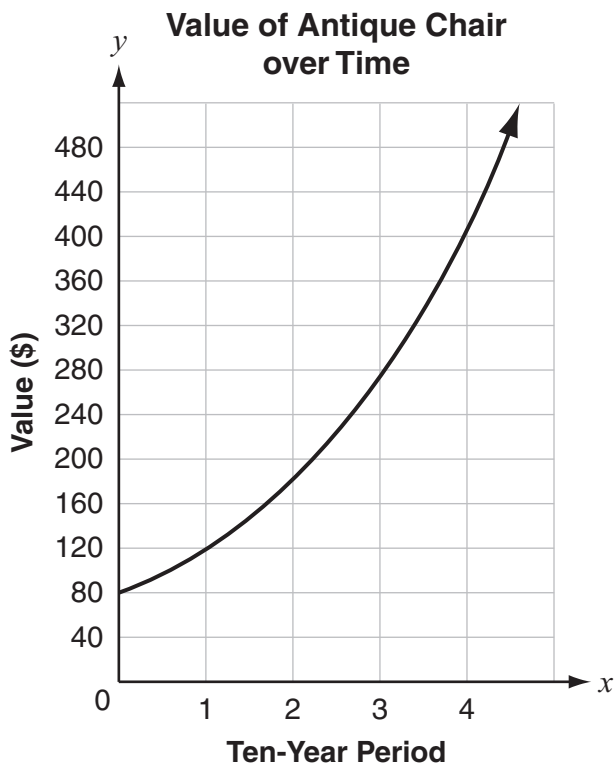
a. By what amount did the value of the antique chair increase during the first ten-year period?

b. By what percent did the value of the antique chair increase during each ten-year period? Show your work or explain how you know.

c. During which ten-year period will the value of the antique chair reach $1000? Show your work or explain how you know.